PYRO DV RaidRT

User Guide: First Edition

ADS

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PYRO DV RaidRT User's Guide

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Important Safety, Care and Handling Instructions

1. Before starting, take a few minutes to read this manual, read all of these instructions and save this manual for later reference.

2. Protect the Disk Array from extremely high or temperatures. Let the Disk Array warm (or cool) to room temperature before using it.

3. Protect the Disk Array from being bumped or dropped. Do not place this product on an unstable cart, stand, or table. It may fall, causing serious damage to the product.

4. Keep the Disk Array away from magnetic forces, dust, sand or dirt.

5. Do not use this product near water.

6. Gaps and openings in the cabinet and the back are provided for ventilation. To ensure reliable operation and to protect it from overheating, the gaps and openings should never be blocked or covered by placing the product on a bed, sofa, rug, or other similar surface.

7. Do not place this product near or over a radiator or heat register.

8. Refer to rating plate for voltage and check that the appliance voltage corresponds to the supply voltage.

9. The appliance must be grounded. This product is equipped with a 3-wire grounding-type power cord, this power cord will only fit into a grounding type power outlet.

10. If an extension cord or a power center is used with this product, make sure that the total of all products plug into the wall outlet does not exceed the ampere rating.

11. Do not place the Disk Array where the cord will be walked on.

12. Never push any kind of object into this product through cabinet gaps and openings, they may touch dangerous voltage points cause a risk of fire or electric shock.

13. Unplug the power cord from the wall outlet before cleaning. Keep the Disk Array dry. Do not use liquid cleaners, aerosol cleaners, or a wet cloth. Use a damp cloth for cleaning.

14. Except as specifically explained in this User's Manual, please do not attempt to service this product by yourself. Opening or removing the covers may expose you to dangerous voltages.

15. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions: If this product has been exposed to water or any liquid. If the product has been dropped or the cabinet damaged.

Operating Environment

When selecting a suitable working location, please consider :
   - Ventilation
   - Temperature
   - Dust and dirt
   - Electromagnetic and Radio Frequency Interference.
   - Security
The selected location should provide at least six inches of open space around the Disk Array cabinet for proper air flow.

Your Disk Array functions best at normal room temperature. Choose   a location free from extreme heat or cold.
Warning! The Disk Array's LCD Panel may be damaged by exposure to intense sunlight. Limit exposure to indirect or subdued sunlight only.

Your Disk Array should be used in a clean environment that is free from airborne contaminants such as dust, dirt, and smoke. Excessive moisture or oil particles in the air can also hinder your system's performance.

To reduce the possibility of data errors caused by electromagnetic interference, locate your Disk Array at least five feet away from electrical appliances and equipment that generates magnetic fields.

<u>**Features**</u>

This section provides an overview of the features. For more detailed information, please refer to the technical specifications appendix at the end of this manual .Your Disk Array includes the following features :

Easy Operation

As everyone knows, conventional Disk Arrays are designed for experienced computer specialists. To solve complicated and time consuming operating procedures, we came up with a revolutionary idea:

-- Innovative Plug And Play RAID --

As compared to a conventional Disk Array's long-winded setup   procedures, your Disk Array can be ready to go after using the simple step by step built-in setup program.

Ultra High Performance

- Your Disk Array combines an extremely high speed microprocessor with the latest chip set, IDE hardware technology, perfect firmware and an artistic design. The result is one of the fastest, most reliable Disk Array systems on the market.

- IEEE1394 interface to your Host computer, up to 400Mbits data transfer rate provides the processing and access power for you to handle complex and large files.
- Selective RAID levels 0, 1, 0+1, 3 or 5.
- Built-in 64MB cache memory, expandable up 128 MB.
  Serial communication port (Terminal Port) permits array controller   operation through a standard VT100 terminal (or equivalent).

Solid reliability

- Automatic failed disk drive detection.
- Auto rebuild : when a replacement disk installed (or by using hot spare disk),
  The system provides automatic data rebuild without any commands or functions keyed in.
  (Transparent to Host)

Efficient maintenance

- An LCD status panel displays a comprehensive readout of the operating status, and the HDD LED indicators on each HDD tray display the individual HDD status.
- When disk failure occurs on a member disk of the disk array, the built-in buzzer sounds simultaneously and LCD status panel also points out the location of the failed hard disk drive. The LED HDD status indicator will light up " Red "on the failed HDD tray. You can perform quick, efficient and correct maintenance.
- Hot Swap : you can remove, install, then " Hot Swap " parts without interrupting data access while the system is on.

The " Hot Swap " parts include the Hard Disk Drive and Cooling Fan.

<u>**General RAID Concepts**</u>

Correct installation of the disk array requires an understanding of
RAID technology and the concepts described in this section.

Definition
RAID is an acronym of Redundant Array of Independent Disks .A RAID is a Disk Array in which
part of the storage capacity is used to record redundant information about the user data stored on
the remainder of the storage capacity. The redundant information enables regeneration of user
data in the event that one of the Array's member Disks or the access path to it fails.

Benefits of RAID
- Secure Data RAID is an emerging storage technology with the potential to   revolutionize
  the data storage technology. A typical RAID unit contains a set of disk drives, typically two
  to six, which appear to the user to be equivalent to a single large capacity disk drive. The
  remarkable benefit of disk array is that if any single disk in the RAID fails, the system and
  array still continues to function without loss of data. This is possible because the redundancy
  data is stored on separate disk drives and the RAID can reconstruct the data that was stored
  on the failed disk drive.

- Increases system performance As the effective seek time for finding data on a disk can
  potentially be reduced by allowing multiple simultaneous access of different data on different
  disks. Utilizing parallel reads and writes of the data spread across the disks in the array, the
  data transfer rate can be increased significantly over that of a single disk.

- Easy RAID system maintenance is typically simplified because it is easy to replace individual
  disks and other components while the system continues to function. (Hot swap support)

RAID LEVELS

RAID Level 0 : " Disk Striping " High I/O Performance

- Improved I/O performance is the major reason for using RAID level 0. No protection is provided against data loss due to member disk failures. A RAID level 0 array by itself is thus an unsuitable storage medium for data that can not easily be reproduced, or for data that must be available for critical system operation. It is more suitable for data that can be reproduced or is replicated on other media.

A RAID level 0 array can be particularly useful for :
- Storing program image libraries or runtime libraries for rapid   loading, these libraries are normally read only.
- Storing large tables or other structures of read only data for rapid   application access. Like program images, the data should be backed up on highly reliable media, from which it can be recreated in the event of a failure.
- Collecting data from external sources at very high data transfer   rates.

RAID level 0 arrays are not particularly suitable for :
- Applications which make sequential requests for small amount of data. These applications will spend most of their I/O time waiting for disks to spin, whether or not they use striped arrays as storage media.
- Applications which make synchronous random requests for small amounts of data.
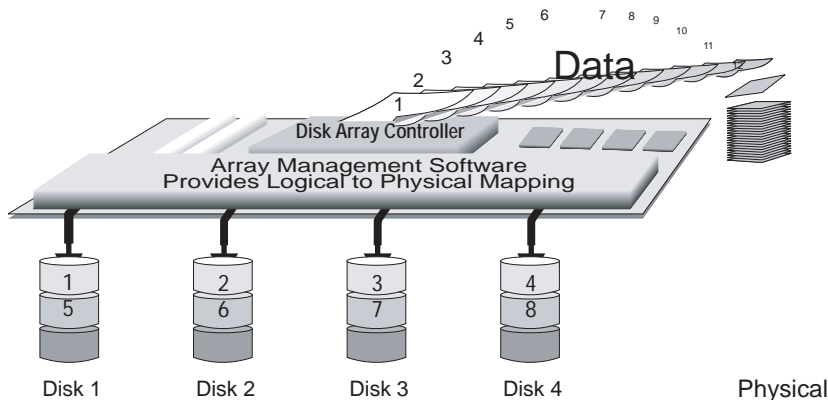
Figure: Disk Striping

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RAID LEVELS (CONT'D)

RAID Level 1 : " Disk Mirroring " High Data reliability

RAID level 1 provides both very high data reliability and continued data availability in the event of a failure of an array member. When a RAID level 1 member disk fails, array management software simply directs all application requests to the surviving member.

RAID level 1 is suitable for data for which reliability requirements are extremely high, or for data to which high performance access is required, and for which the cost of storage is a secondary issue.

Figure: Disk Mirroring

RAID LEVELS (CONT'D)

RAID Level 3 :
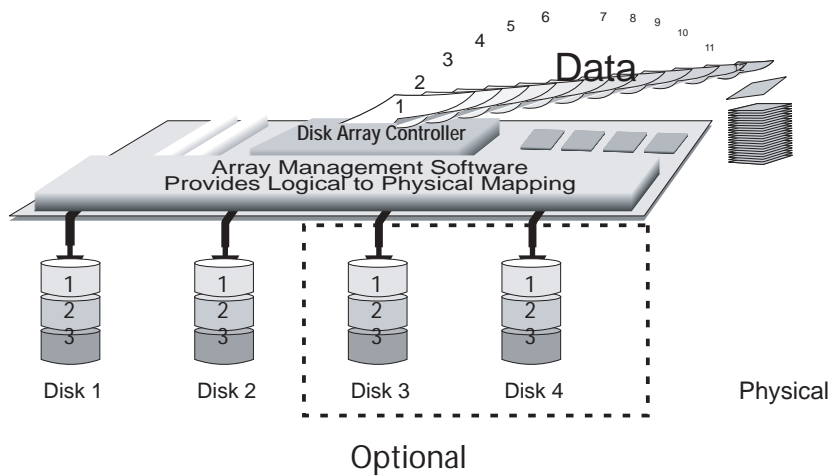 **"Parallel Transfer Disks with Parity "High Data Reliability & Highest Transfer Capacity**

RAID Level 3 technology use a dedicated parity disk to store redundant information about the data on several data disks. RAID Level 3 is an excellent choice for applications which require single stream I/O with a high data transfer rate.

RAID Level 3 is optimal for applications in which large blocks of sequential data must be transferred quickly, these applications are usually of one of these types:

- They operate on large data objects such as graphical image processing, CAD/CAM files, and others.
- They are non-interactive applications that process large data sequentially.

They usually request a large amount of data (32KBytes or more) with each I/O request.

The distinctive performance characteristics of RAID Level 3:
- RAID Level 3 provides excellent performance for data transfer-intensive applications.
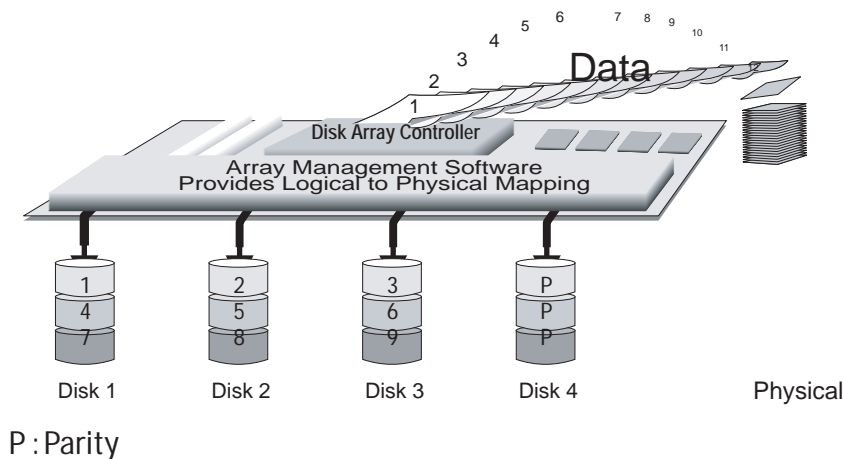- RAID level 3 in not well suited for transaction processing or other I/O request-intensive applications.

Figure: Parallel Transfer with Parity

RAID LEVELS (CONT'D)

RAID Level 5 :
"Independent Access Array with Rotating Parity "High Data Reliability & Transfer Capacity

When RAID Level 5 technology is combined with cache memory to improve its write performance, the result can be used in any applications where general purpose disks would be suitable.

For read only or read mostly application I/O loads, RAID Level 5 performance should approximate that of a RAID Level 0 array. In fact, for a given user capacity, RAID Level 5 read performance should normally be slightly better because requests are spread across one more members than they would be in a RAID Level 0 array of equivalent usable capacity.

A RAID level 5 array performs best in applications where data and I/O load characteristics match their capabilities :
- Data whose enhanced availability is worth protecting, but for which the value of full disk mirroring is questionable.
- High read request rates.
- Small percentage of writes in I/O load.

RAID level 5 arrays have unique performance characteristics:
- The data can be recalculated or regenerated, using parity, when any drive in the array fails.
- When the failed drive is replaced, either automatically if the subsystem contained a hot spare drive, or by user intervention during a scheduled maintenance period, the system will be restored its full data redundancy configuration by rebuilding all   of the data that had been stored on the failed drive onto the new drive. This is accomplished using parity information and data from the other data disks. Once the rebuild process is complete, all data is again protected from loss due to any   failure of a single disk drive.

P : Parity
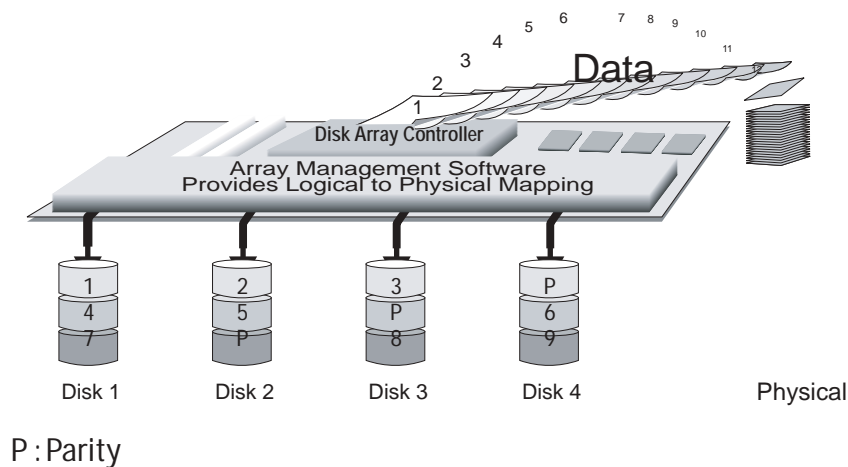
SUMMARY COMPARISON OF RAID LEVELS

RAID Level	Common Name	Description	Array's Capacity	Data Reliability	Data Transfer Capacity
0	Disk Striping	Data distributed across the disks in the array. No redundant Information provided.	(N) disks	Low	Very High
1	Mirroring	All data Duplicated	1*disk	Very High	High
3	Parallel Transfer Disks with Parity	Data sector is subdivided and distributed across all data disk. Redundant information stored on a Dedicated parity disk.	(N-1) disks	Very High	Highest of all listed alter- natives
5	Independent Access Array with Rotating Parity	Data sectors are distributed as with disk striping, redundant Information is interspersed with user data.	(N-1) disks	Very High	Very High

SUPPORTED RAID LEVELS

RAID Level	Function Description	Drives required Min.	Max.
0	"Disk Striping" , block striping is used, which yields higher performance than with the individual disk drives. * There is no redundant function.	2	4
1	"Disk Mirroring" , Disk drives are mirrored , All data is 100% duplicated on each equivalent disk drives. * High Data Reliability	2	4
3	"Parallel Transfer Disks with Parity ", Data is striped across physical drives. Parity protection is used for data redundancy.	3	4
5	"Independent Access Array with Parity ", Data is striped across physical drives. Rotating Parity protection is used for data redundancy.	3	4
0+1	"Disk Striping " + " Disk Mirroring " Function.	4	4

<u>**GENERAL OVERVIEW**</u>
This chapter helps you get ready to use the Disk Array. It gives you :
- Unpacking & Checklist
- Choosing a place for Disk Array
- Identifying Parts of Disk Array
- Power Source
- Installing the Hard Disk Drives
- Power-On and Self-test
- LED Display and Function Keys
- LCD Status Display
- Configure Your RAID (See Ch. 3)
- Host Linkage

The following illustrations will help you read the further sections.
Special Note: RAID should never be considered a replacement for doing
regular backup. It's highly recommended to conduct a
backup strategy for critical data.

Unpacking & Checklist
Before unpacking your Disk Array , prepare a clean and stable place to put the contents of your
Disk Array's shipping container on. Altogether, you should find the following items in the package:

1. The Disk Array
2. One AC power cord
3. One External IEEE 1394 cable
4. Keys (For HDD Trays)
5. User Guide

Remove all the items from the carton. If anything is missing or broken , please inform your dealer
immediately. Save the cartons and packing materials that came with the Disk Array. Use these
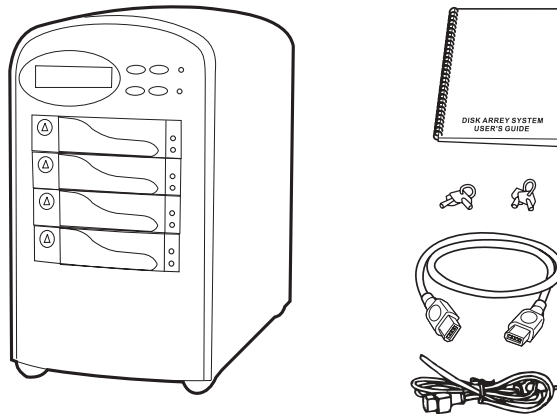materials for shipping or transporting the Disk Array.

Figure: Checklist

<u>**CHOOSING A PLACE FOR THE DISK ARRAY**</u>
When selecting a place to set up your Disk Array, be sure to follow the guidelines as below:
- Place on a flat and stable surface Use a stand that supports at least 50 kgs for this Disk Array. (HDD included)
- Place the Disk Array close enough to the computer for the Disk Array's External cable to reach it.
- Use a grounded wall outlet.
- Avoid an electrical outlet controlled by wall switches or automatic timers. Accidental disruption of the power source may wipe out data in the memory of your computer or Disk Array.
- Keep the entire system away from potential sources of electromagnetic interference, such as loudspeakers , cordless telephones, etc.

   Caution !   Avoid direct sunlight, excessive heat, moisture, or dust.

<u>**IDENTIFYING PARTS OF THE DISK ARRAY:**</u> Front View

1. LCD Status Display Panel
2. HDD Trays 1-4
3. Function Keys
4. Power-On Indicator
5. Host Computer Access Indicator
6. HDD Tray Lock (Lock / Unlock)
7. HDD Status Indicator
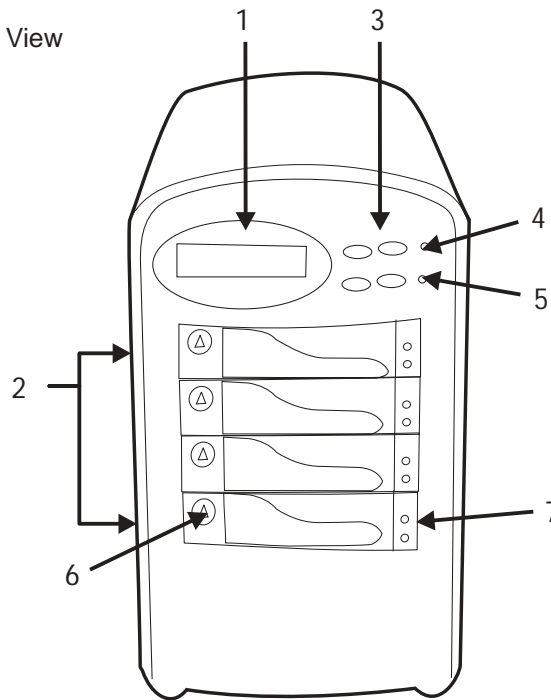(Error (Red), Access (Yellow), Power-On (Green))

Figure: Front View

IDENTIFYING PARTS OF THE DISK ARRAY: Rear View

1. RS232 Adapter (Terminal Port)
2. Cooling Fans
3. Power Supply
4. IEEE 1394 Host channel adapter Port
5. Fan Door Screws
6. AC Power Source Input Socket
7. AC Voltage Select Switch (115V / 230V)
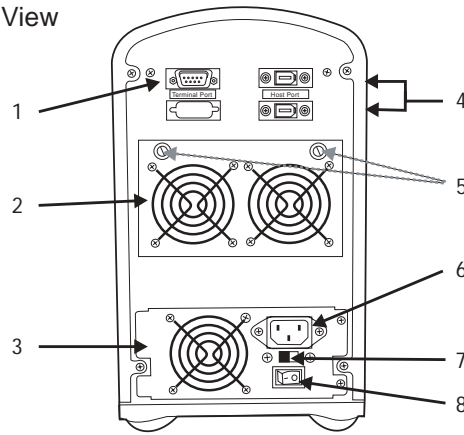8. Power Supply Unit Switch (On / Off)

Figure: Rear View

POWER SOURCE

Choosing a Working Voltage
The system can run either on AC 115V (+/10%) or AC 230V (+/10%), Slide the AC voltage select switch on the power supply to the correct position which corresponds with the wall outlet supply voltage.

Warning ! Wrong AC Voltage input will harm the power supply and cause serious damage to the Disk Array.

This Disk Array must be grounded! This Disk Array is supplied with an AC power cord equipped with a 3-wire grounding type plug. This is a safety feature and it is important to only use a 3-wire grounded mains power cord.
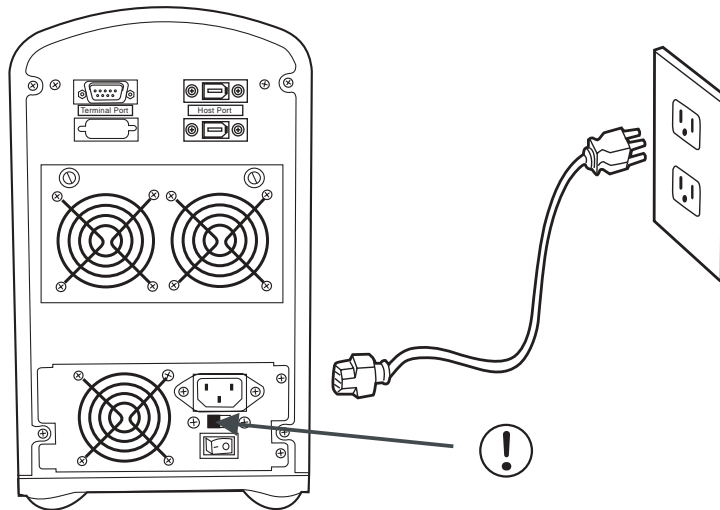
Figure: Power Source

INSTALLING THE HARD DISK DRIVES

Step 1 : Turn the key-lock to unlock the HDD tray
Step 2 : Gently Pull out the HDD tray.
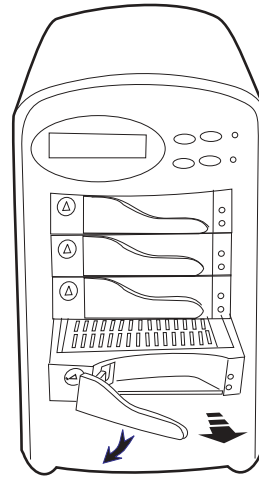
Cabling

Step 3 : Insert HDD into the tray
Step 4 : Screw in the hard drive.
(Use the correct size, type and thread)
Step 5 : Cabling, Connect the Data cable
and Power cable.

SCREWS   SCREWS

Step 6 : Gently slide in the HDD tray.
Step 7 : Lock the HDD tray. When powered on,
the Green LED will light up.

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POWER ON AND SELF TEST

When you connect the Disk Array to the Host computer, You should press the ON/OFF Switch (O / I) on the power supply, it will turn the Disk Array system on and the Self-Test will be started automatically.
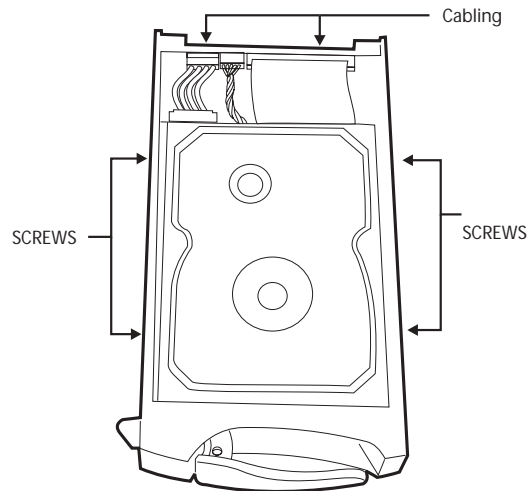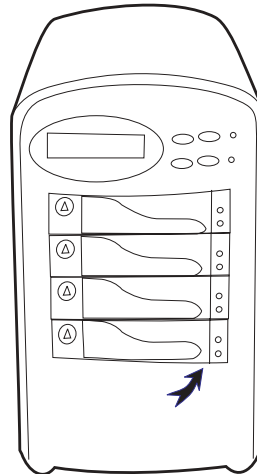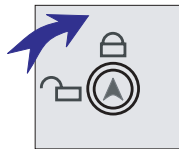
LED DISPLAY AND FUNCTION KEYS

LED Display

Shown below is the LED Display. Please refer to the illustration, the LEDs inform you of the Disk Array's current operating status. Upon activating a certain function, the corresponding LED indicator should turn on indicating that the feature is engaged.
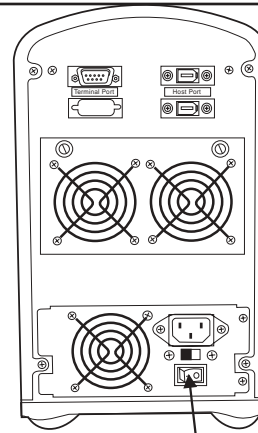
Power Supply's On / Off Switch
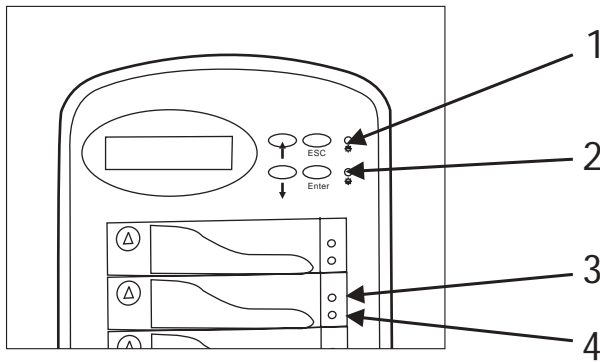
LED	Descriptions
1. Power ON Indicator	light up : "Green" , it lights when the Power Supply is plugged and operating functionally.
2. Host Computer Access Indicator	light up : "Yellow" , Indicates Host computer is currently accessing the Disk Array
3. HDD Power-On Indicator	light up : "Green" , It lights when the HDD frame is locked and Power-On
HDD Error Indicator	light up : "Red" , when the HDD not installed or error.
4. HDD Access Indicator	light up : "Yellow" , when HDD is access.

FUNCTION KEYS

The four function keys at the top of the front panel perform the following functions :

( ) Up Arrow / Right Arrow	Use to scroll the cursor Upward / Rightward
( ) Down Arrow / Left Arrow	Use to scroll the cursor Downward / Leftward
(Enter)	Use to confirm a selected item
(ESC)	Use to exit a selection

LCD Status Panel

 Located the LCD panel, the LCD status panel informs you of the Disk Array's current operating status at a glance. Upon activating a certain function, a symbol or icon corresponding to that function will appear in the display window. The symbol will remain in the display window indicating the status of the Disk Array.

Identifying the status on the LCD
The following illustration shows the symbols (characters) been used and their representation. A description of each of the symbols in LCD display window :

O: On-line and functional
R: Error occur
I: Identifying Disk Drive
S: Spare Disk Drive
X: Disk Drive not installed
W: Warning : Disk Drive with too many Bad Sectors

Example of the LCD status display window : OOSX   R5 ID:0

This informs you :
    a. HDD 1 ~ HDD 2 : On-line
    b. HDD 3   : It is a Spare disk drive
    c. HDD 4   : Not installed
    d. RAID Level   : In " RAID Level 5 "
    e. ID   : In " ID# 0 "

HOST LINKAGE

With the HDD(s) installed correctly, you are ready to connect the Disk Array to your Host computer. Use a External IEEE 1394 cable to connect your Host computer to the Disk Array's built-in IEEE 1394 adapter port.

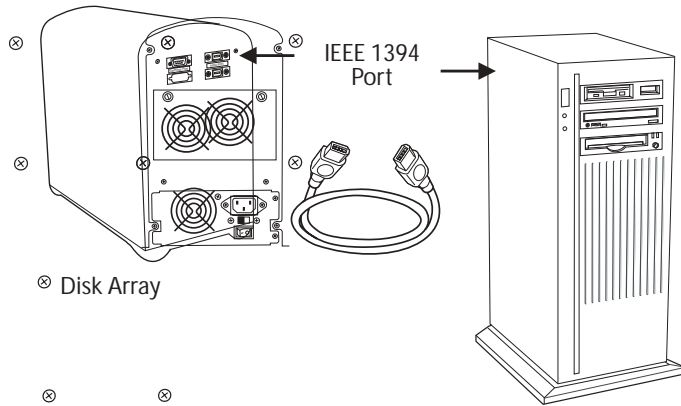Connect the Host computer as shown below :

IEEE 1394
Port

⊗ Disk Array

Figure: Host Linkage

Caution !

For safety reasons, make sure the Disk Array and Host Computer are turned off when you plug-in the FireWire cable.

CONFIGURATION

After completing the hardware installation, the disk array must be configured and the logical unit must be initialized before it is ready to use. This can be accomplished through the following user interfaces:

- Front Panel functions keys (LCD Display)

    Or

- VT100 terminal connected through the serial port (Monitor Port)

    *The LCD display panel and a VT100 terminal can not be used at the same time.

This chapter guides you through setting up your Disk Array for the first time. This chapter contains information on setup. The setup program is a menu-driven utility which enables you to make changes to the configuration and tailor your Disk Array to your individual needs. The setup program is a ROM-based configuration utility which displays the Disk Array's Status and allows you to set up the parameters. The parameters are stored in a nonvolatile battery backup CMOS RMA which saves the information even when the power is off.

By using an easy-to-use user interface, you can configure such items as:
- RAID Level
- Hot Spare Disk
- Termination
- Password (For protection from unauthorized use)
- Firmware update (VT100 Terminal mode only)---for update procedures please refer to Chapter 4: Advanced information.

The setup program has been designed to make it as easy to use as possible. By using a menu-driven program, you can scroll through the various sub-menus and make your selections among the various predetermined choices.

<u>**CONFIGURATION FROM THE FRONT PANEL**</u>

The LCD Display front panel function keys are the primary user interface for the Disk Array.
Except for the "Firmware update", all configuration can be performed through this interface.

Function Key Definitions

The four function keys at the top of the front panel perform the following functions:

(↑)   Up Arrow/Right Arrow   - Use the scroll the cursor Upward/Right
(↓)   Down Arrow/Left Arrow - Use to scroll the cursor Downward/Leftward
                        (**Enter**) - Use to confirm a selected item
                         (**ESC**) - Use to exit a selection

<u>**CONFIGURATION PROCEDURES (VIA FRONT PANEL)**</u>
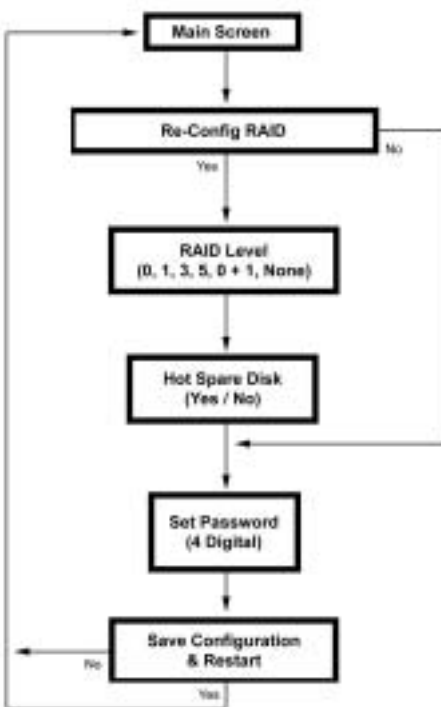
STARTING THE CONFIGURATION

1. Power-on the Disk Array. At the end of the power-on self test program, the LCD display the current system status.

2. Press the front panel "**Enter**" key to access the built-in configuration program.

3. When the screen displays the password prompt and asks you to "enter Password"
   Enter Password
   0 _ _ _
   press "Enter" 4 times to input the default password
   (default password is "0000")

4. Re-Configuration RAID
   Select "**NO**" to just set up "Password"
   Select "**Yes**" to set up "RAID Level","Hot spare disk "and "Password"

5. Set RAID Level
   Move cursor (↓↑) to the desired RAID Level (**0,1,3,5,0+1,None**), press "Enter" to confirm.
   Warning
   All data on the disk drives will be lost by changing the RAID Level.
   *RAID Level "**None**" **= No Configuration**

6. Set Hot Spare Disk
   Select "**Yes**" to set one Disk Drive as a Hot-spare Disk.
   (Valid for RAID Level 5 and 3, the total number of Disk Drives installed must be **more than 3 Disk Drives**)

7. Set Password
   Press "**Enter**" to activate the Password setting. When the cursor stop on the desired "number" or "character", Using "↓"and "↑" function keys to choose the desired characters and then press "**Enter**" to confirm it.
   * Press "**ESC**" function key for password "**No Change**"

8. Save Configuration & Restart
   Select the Save Configuration function and Press the "Enter" key to save and activate your selections.

   STOP Warning! All data will be lost if you change RAID Levels.

   Warning
   Saving configuration changes causes the disk array controller's working parameters to change. This can produce unpredictable results if it occurs during Host and Array activity. All activity to the controller should be stopped before saving configuration changes.

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CONFIGURATION FROM VT100 TERMINAL MODE

By connection a VT100 compatible terminal or a PC operation in a terminal emulation mode, a configuration can be performed through this interface.
To ensure proper communications between the "Disk Array" and the "Terminal", Please configure the VT100 terminal settings to the values shown below:

VT100 Termnal (or compatible) Set up

Connection	Serial Port (COM1 or COM2)
Protocol	RS232 (Asynchronous)
Cabling	Null-Modem cable
Baud Rate	115,200
Data Bits	8
Stop Bit	1
Parity	None

Keyboard Function Key Definitions
"**Enter**" key, Use to confirm a selected item
"**ESC**" key, Use to exit a selection
"**A**" key, Used to scroll the cursor Upward/Rightward
"**Z**" key, Use to scroll the cursor Downward/Leftward
"**Tab**" key, Use to switch mode (Menu/Output Area)

CONFIGURATION PROCEDURES (VT100 Terminal)

MAIN SCREEN

RE-CONFIG RAID

Select "No" for setting: "Password"
Select "Yes" for setting all the configurations
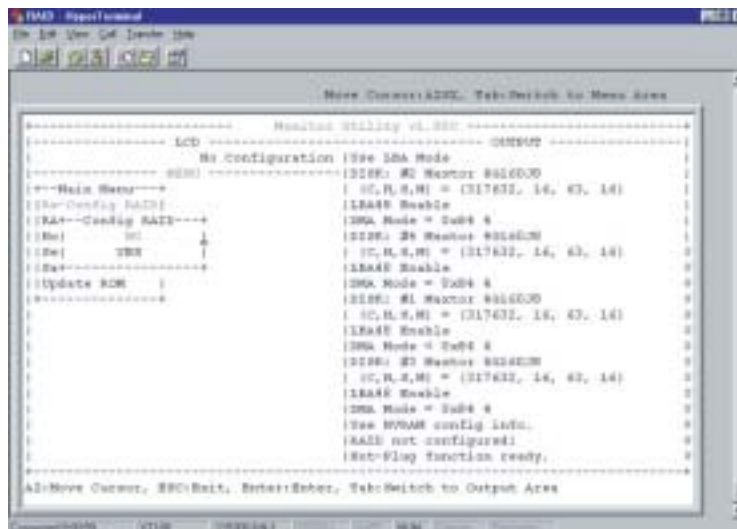
SET RAID LEVEL

Move the cursor to the desired RAID Level (0,1,3,5,0+1,None), and Press "Enter" to confirm it.
Warning All Data will be lost by changing the RAID level.

HOT SPARE DISK
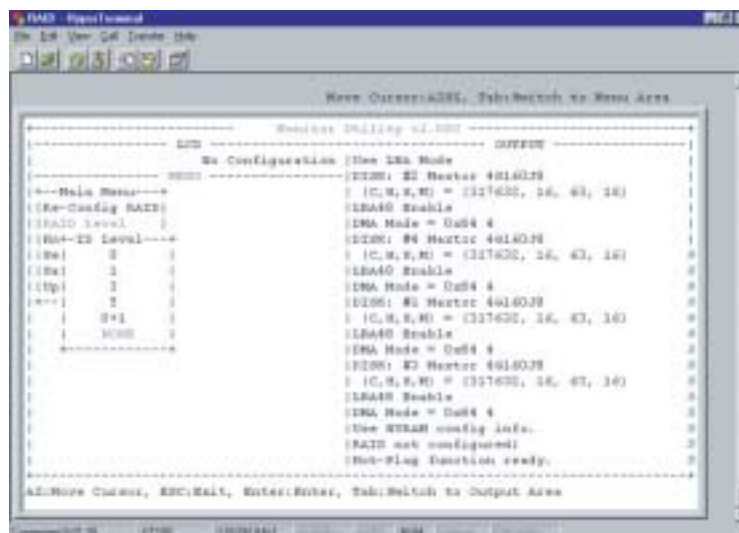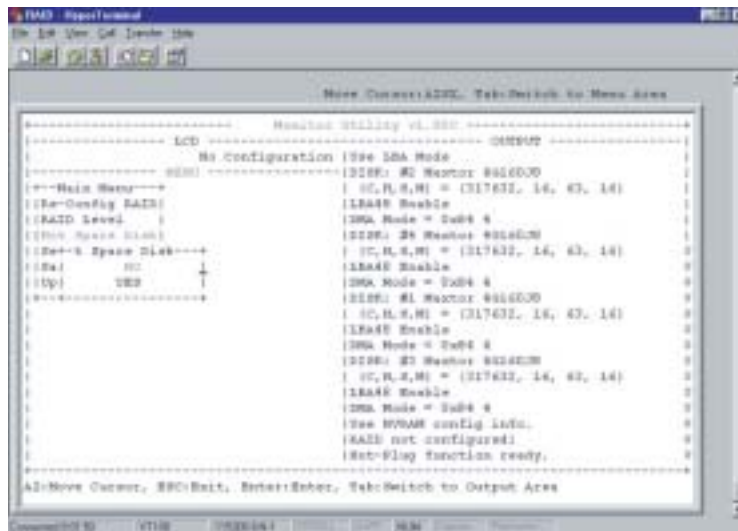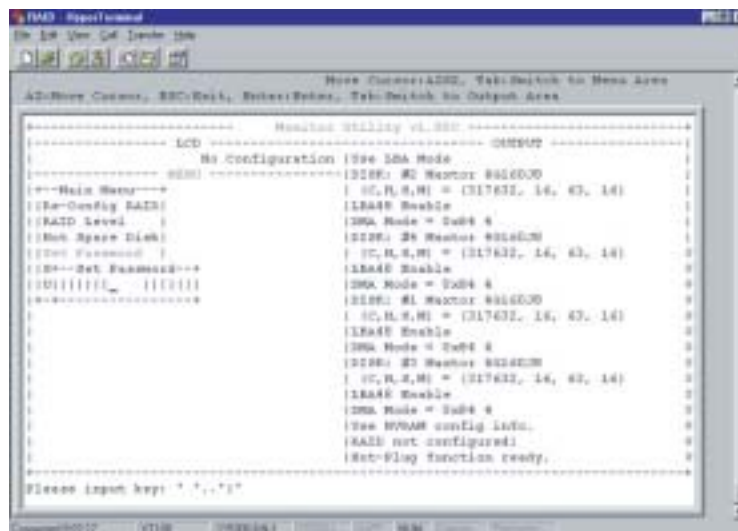Select "**Yes**" to set **One Disk Drive** as a Hot Spare Disk.
This Function is **valid in RAID level 5** and **RAID level 3**, the total Disk Drives installed must be more than 3 Disk Drives.
(Disk Drives number > 3)

SET PASSWORD
Press "**Enter**" to activate the password setting when you Key-in the desired "Number" or "Character". Press "**ESC**" for no change to the password.

SAVE & RESTART

Select the Save & Restart function and press "Enter" to save and activate your selections.

Stop!
Warning! All data will be lost if you change the RAID level

Warning
Saving configuration changes causes the disk array controller's working parameters to change. This can produce unpredictable results if it occurs during Host and Array activity. All activity to the controller should be stopped before saving configuration changes.
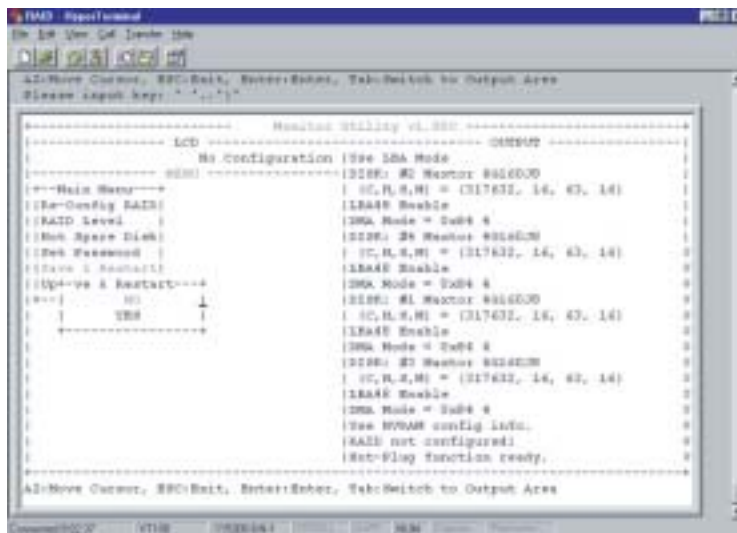
This chapter describes more information about your Disk Array. The following items are describes in detail.
- Memory Expansion
- RAID Controller
- Updating Firmware

MEMORY EXPANSION

Your Disk Array comes with 64MB of memory that is expandable to a maximum of 512MB. These expansion memory module can be purchased from your dealer.

- Memory Type : 3.3V PC100/133 SDRAM 144pin DIMM.
- Memory Size : Supports 144pin DIMMs of 64MB, 128MB, 256MB or 512MB.
- Height : 1.15 Inches (29.2 mm)

64MB	8(8Mx8), 8(4Mx16) or 4(8Mx16)
128MB	16(8Mx8), 8(16Mx8), 8(8Mx16) or 4(16Mx16)
256MB	16(16Mx8), 8(32Mx8) or 8(16Mx16)
512MB	16(32Mx8)

1.15" (29.2mm)
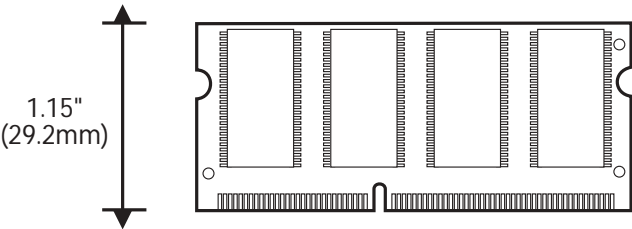
Installing Memory Modules :
Step 1. Unscrew & Remove cover

Step 2. Install the memory

    a. The DIMM memory modules will only fit in one orientation.
    b. Press the memory module firmly into socket from a 45 degree
        angle, make sure that all the contacts are aligned with the
        socket.
    c.   Push the memory module forward to a horizontal position.
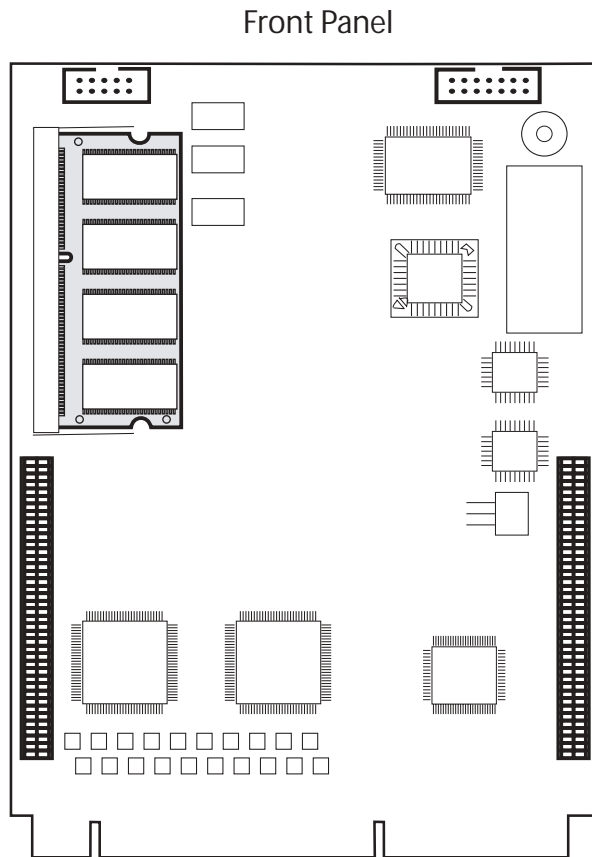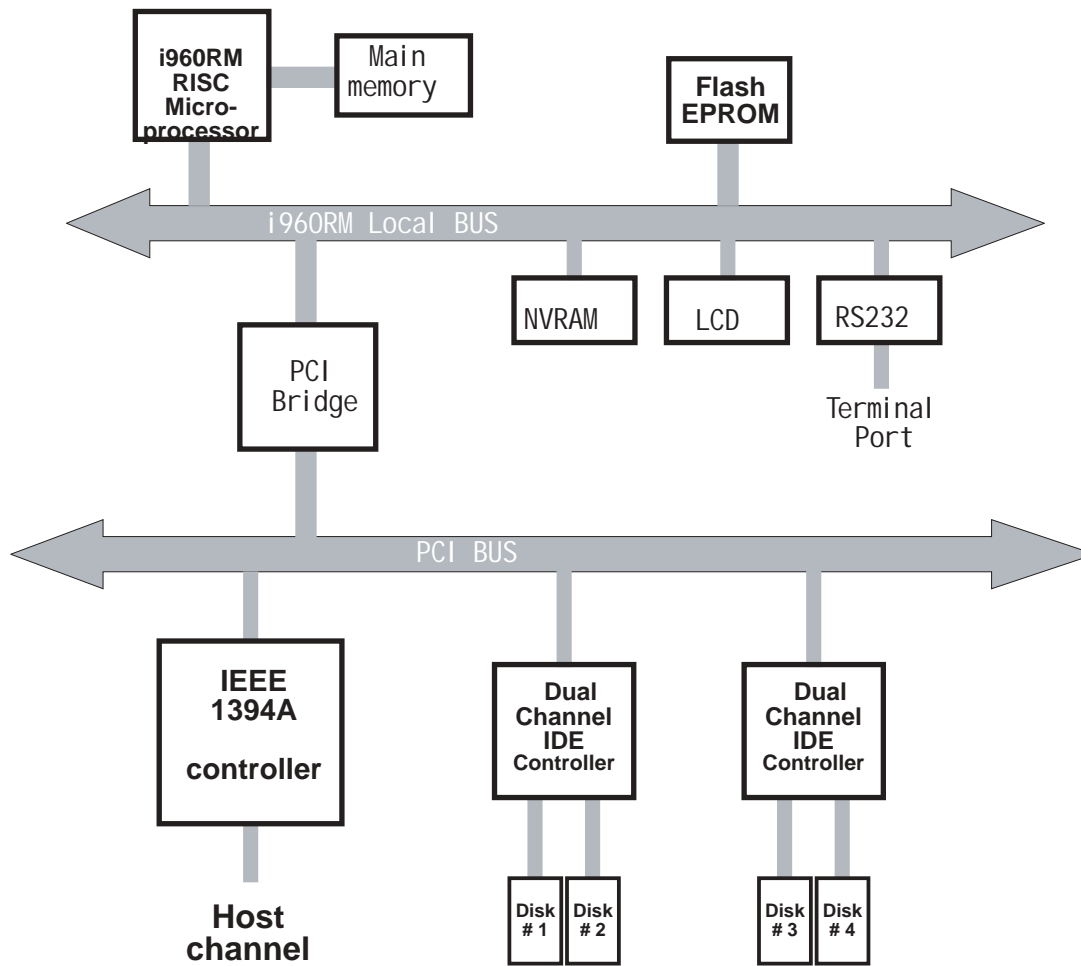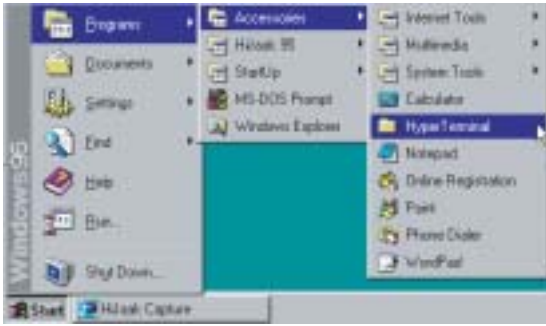
Front Panel

Figure : Controller

DISK ARRAY CONTROLLER BLOCK DIAGRAM

```
┌──────────────┐   ┌──────────┐              ┌──────────┐
│   i960RM     │   │   Main   │              │  Flash   │
│   RISC       │───│  memory  │              │  EPROM   │
│   Micro-     │   │          │              │          │
│  processor   │   └──────────┘              └──────────┘
└──────────────┘
        ═════════════════ i960RM Local BUS ═════════════════

                        ┌────────┐  ┌────────┐  ┌────────┐
                        │ NVRAM  │  │  LCD   │  │ RS232  │
                        └────────┘  └────────┘  └────────┘
   ┌──────────┐                                      │
   │   PCI    │                                  Terminal
   │  Bridge  │                                    Port
   └──────────┘
        ══════════════════════ PCI BUS ══════════════════════

   ┌──────────┐        ┌──────────┐        ┌──────────┐
   │   IEEE   │        │   Dual   │        │   Dual   │
   │  1394A   │        │ Channel  │        │ Channel  │
   │          │        │   IDE    │        │   IDE    │
   │controller│        │Controller│        │Controller│
   └──────────┘        └──────────┘        └──────────┘
                        ┌───┐┌───┐          ┌───┐┌───┐
     Host               │Disk││Disk│        │Disk││Disk│
   channel              │# 1 ││# 2 │        │# 3 ││# 4 │
                        └───┘└───┘          └───┘└───┘
```

UPDATING FIRMWARE
Step 1. Setup your VT100 Terminal

Please configure the VT100 terminal setting to the values shown below :

VT100 terminal (or compatible) set up
Connection   Serial Port (COM1 or COM2)
Protocol   RS232 (Asynchronous)
Cabling   Null-Modem cable
Baud Rate   115,200
Data Bits   8
Stop Bit   1
Parity   None

Step 2.

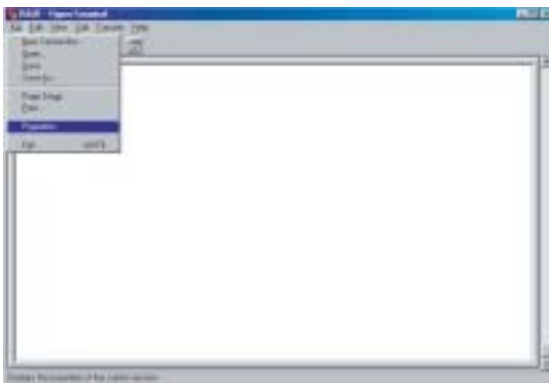**Step 3.** Enter a name for your Terminal.

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UPDATING FIRMWARE (CONT'D)

Step 4. Select a connecting port in your Terminal.

Step 5. Port parameter settings

Step 6.

UPDATING FIRMWARE (CONT'D)

Step 7. Select emulate VT100 model
After you have finished the VT100 Terminal setup, you may restart your Disk Array and press "
Ctrl + D " keys (in your Terminal)to linkthe Disk Array and Terminal together.

Press **Ctrl + D** to display the disk array Monitor Utility screen on your VT100 Terminal.
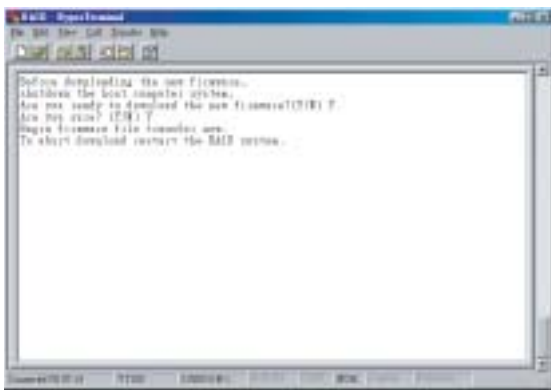
START TO UPDATE FIRMWARE

**Step 1.** Move the cursor to " Update ROM " and press "Enter".

WARNING
Unpredictable results will occur if firmware update is attempted
during Host computer and Disk Array activity. All activity to the
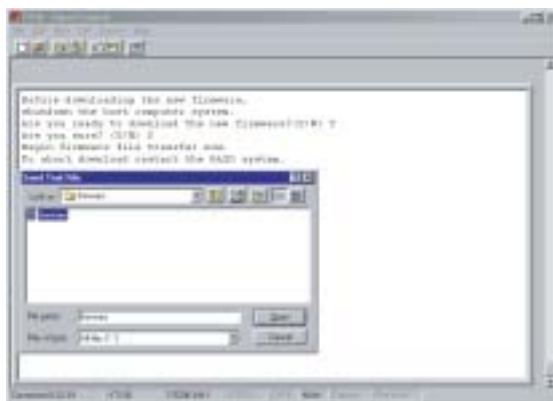controller should be stopped before updating firmware

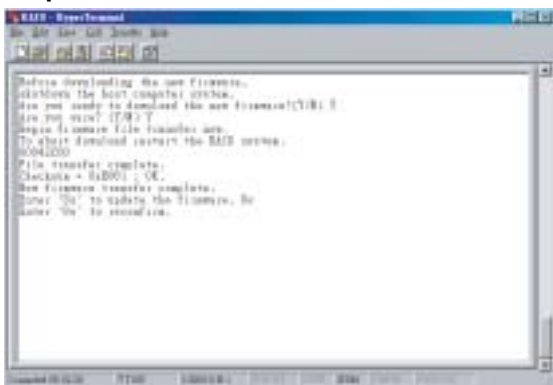**Step 2.** Press " Y " to download the new firmware and press " Y " again to confirm the Update.

Step 3. Select transfer " Send Text File " and press Enter.
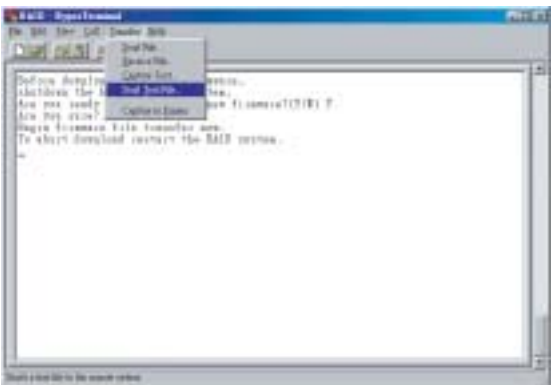
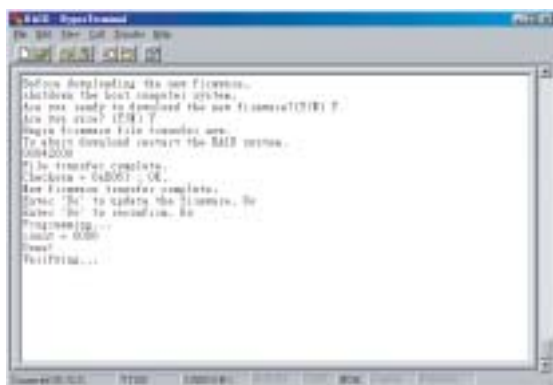**Step 4.** Locate the new Firmware file on your PC.

Step 5. Press " Go " to confirm to download the new firmware.

Step 6. Type " Go " to reconfirm and the firmware will begin to be reprogrammed.
Step 7. After verifying, please restart the Disk Array to activate the new firmware.

This chapter explains how to remove and install the "Hot-Swap" parts without interrupting the data access while the disk array is on.
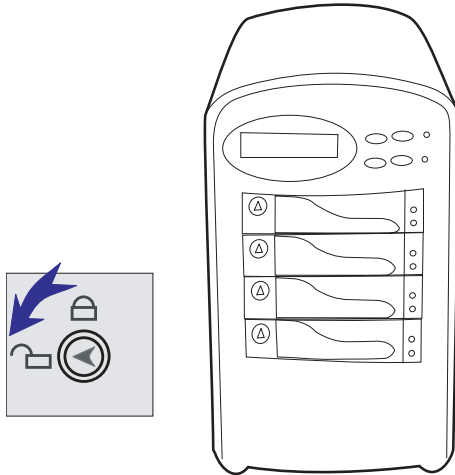
The "**Hot-Swap**" parts include :
- Hard Disk Drives
- Cooling Fans

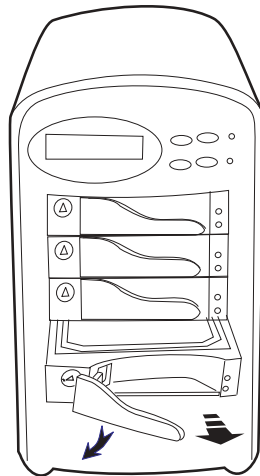Follow the steps below and refer to the diagrams to remove and install the "Hot-Swap" parts.

REMOVING / INSTALLING HARD DISK DRIVES

Step 1. Unlock the HDD tray
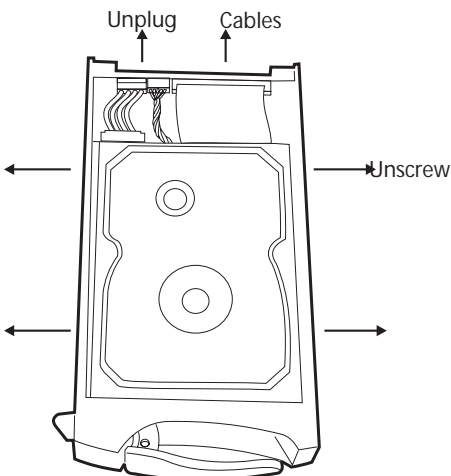   (When a HDD error occurs, the HDD LED indicator lights up "RED")

Step 2. Gently pull-out the HDD tray

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REMOVING / INSTALLING HARD DISK DRIVES (CONT'D)

Step 3. Unscrew and unplug the cables

Step 4. Replace with a new Hard Disk Drive
It must be same capacity or greater than the faulty drive, if you replace with a Hard disk Drive of insufficient capacity, the Disk Array's built-in buzzer will sound and the intelligent Auto-Rebuild function will not be started.

* For best performance, we recommend you swap with an identical Hard Disk Drive.

Step 5. Gently Slide-in the HDD tray and lock up to start the Auto-Rebuild
When you have installed the replacement disk drive, screw in all the screws and plug in the cables, you may now gently slide in the HDD tray into the chassis and lock up it.

*Data Auto-Rebuild will be started automatically when you lock up the HDD tray.
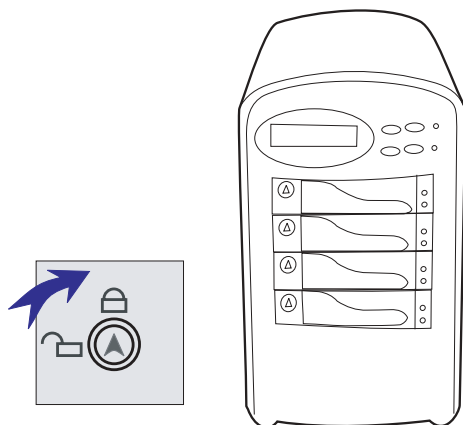
REMOVING / INSTALLING COOLING FANS

Step 1. Unscrew the Fan door and open the door.
Caution: Be careful , the high speed rotating fans may harm you. Don't touch the rotating Fans,
If necessary, Unplug the Fan power connector first.

Unscrew Here !
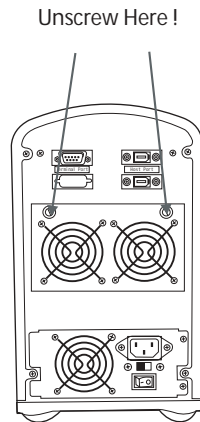
Step 2. Unplug the Fan connector

Step 3. Unscrew the faulty cooling fan and replace with a good one
¸*Important ! The cooling fan's air flow must point to the fan door, please refer to the label on the cooling fan.*

Step 4. Plug in the fan connector, close the fan door and screw it in

Caution : The cooling fan will rotate immediately when you plug in the fan power connector.
The Cooling Fan will only fit in one orientation

Technical Specifications

Microprocessor	Intel i960RM RISC processor
Cache Memory	64MB* Maximum 128 MB

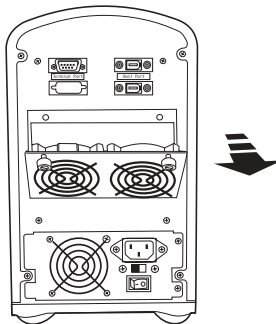|	
DRAM Slots	One
Module Type	144 Pin DIMM
DRAM Type	SDRAM
DRAM Speed	PC100/133
Parity	Non-Parity
Read Cache	Read-Ahead
Write Cache	Write Back*

Stripe Size	Variable (8 ~ 128KB)
Firmware	Flash EEPROM ,256K x 8
Hardware XOR Accelerate	Build-In
IEEE 1394 I/O Processor	TI TSB43AB22

Serial Port	1x RS232 (Asynchronous) Port
Ba ud Rate	115,200 (Bits Per Second)
Da ta Bits	8
Sto p Bit	1
Pari ty	None

RAID Levels	0 , 1 , 0+1, 3 or 5
Data Transfer Rate	Up to 400Mbits
Interface : Host Channel	1* IEEE 1394A Firewire
Disk Channels	4* EIDE ATA-100

Drives	Hot Swap, User Replaceable Up to Four 3.5" drives (1" height)
Maximum Fault Tolerant Capacity	>480 GB
Drive MTBF	>1,000,000 hrs
Host Requirement	Host Independent

Operating Systems   O/S Independent and Transparent

Data Rebuild   Automatic Data Regeneration

LCD Display Panel   2 x 16 Characters

Cooling Fans   6cm Ball Bearing Fan
                        2 Fans

Power Supply Capacity   200W

AC Input Voltage   115 / 230V (+/10%) , 60/50 Hz

Environmental
  Relative Humidity   10% to 85% Non-condensing
  Temperature Operating :   5¢J~ 40¢J
                Storage :   -25¢J~ 60¢J
Safety testing   Under apply UL, CE and FCC Class B
Dimensions   165mm(W) * 295mm(D) * 280mm(H)
Weight   7 kgs (W/O Disk Drive)

" * " Default Settings

*** Various trademarks belong to their respective owners.»

Service and Warranty:

Service:

If you require assistance with the installation, operation, or application of your ADS Technologies, Inc. product there are several options available to you as described in the technical support section of this manual. Your primary source for information and assistance is always your computer store or computer parts dealer. If your ADS product needs repair or replacement, contact your dealer for on-site repair service.

The ADS Technologies technical support and customer service staff can aid in solving many problems. Our technical support department is available to repair any ADS Technologies product. You or your dealer must return products to our factory for repair or warranty replacement.

Return/Replacement:

If you need to return your ADS Technologies product you should return the product directly to the dealer or store where you purchased the product. Each individual computer store or dealer sets product return policies for their customers. ADS Technologies, Inc. cannot be responsible for the actions or policies set by our dealers. If you desire to return the product for a refund, you must get the refund from the dealer or store you purchased the product from. If you purchased the product directly from ADS, please see the "Terms and Conditions of Sale" on the reverse side of your sales invoice.

Returns to ADS Technologies, Inc. are for repair or warranty replacement only. If you need to return a product to ADS Technologies, Inc. for repair or replacement you must follow these steps:

1. Call our Technical Support department to obtain a Return Merchandise Authorization (RMA) number.

2. The RMA number is valid for 30 days.

3. Ship the product to the ADS factory with the RMA number marked on the inside and outside of the package. If there is no RMA number on the package or the RMA number has expired, the shipment will be refused. ADS will not be liable for lost or mis-shipped products.

4. Replacement product cannot be shipped to you until the defective product has been received by ADS.

5. Once the product is received at the factory, it will be tested and then repaired or replaced.

6. Turn around time is approximately one week. The repaired or replaced product will be shipped back to you.

Warranty:

This ADS Technologies, Inc. product comes with a One (1) year hardware warranty. ADS Technologies, Inc. (ADS) warrants this product against defects in material and workmanship for a period of One (1) year from the date of original purchase from ADS or an authorized ADS dealer. This warranty applies only to the original purchase of the product and is not transferable. This warranty does not cover any incompatibilities due to the user's computer, hardware, software or other related system configuration in which the product interfaces. Proof of purchase will be required before any warranty consideration by ADS occurs.

This warranty does not cover any damage caused by negligence, non-authorized modifications, or parts installed without prior written permission from ADS.

This warranty does not apply if the product has been damaged by accident, abuse, or misapplication, nor as a result of service to the product by anyone other than ADS.

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For Technical Support Questions:
Check the ADS web site www.adstech.com
E-mail ADS for help: support@adstech.com
Call ADS for help: 1-562-926-4338
Support Hours: M-F 8:00 AM – 5:00 PM PST

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